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Intelligent Control for Visual Servoing System

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Abstract

This paper presents intelligent control for visual servoing system. The proposed system consists of a camera placed on a Pan Tilt Unit (PTU) which consists of two different servo motors. Camera and PTU are connected to a personal computer for the image processing and controlling purpose. Color threshold method is used for object tracking and recognition. Two different control methods, PID and Fuzzy Logic Control (FLC) are designed and the performances are compared through simulation. From the simulation result, the settling time of PID controller is 40 times faster than FLC. Additionally, the rise time of PID is about 20 times faster than FLC. However, the overshoot percentage of PID controller is 4 times higher than FLC. High overshoot value is not preferable in a control system, since it will cause the damage to the system. Real implementation of FLC on a home-built visual servoing system is conducted. Two different types of FLC, 9 and 11 rules of FLC are designed and implemented on the system. The experimental result shows that FLC with different total number of rules give different system performance. The settling time of FLC with 11 rules is 2 times faster than FLC with 9 rules. Additionally, the overshoot percentage of FLC with 11 rules is 2 times lower than FLC with 9 rules.

Keywords: *PID controller, fuzzy logic controller, visual servoing system, image processing, object tracking*

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